Department of Computer Science

University of Engineering and Technology, Lahore

Structures and Linked List

Problem 1:

Write a program that reads students' names followed by their test scores. The program should output each student's name followed by the test scores and the relevant grade. It should also find and print the highest test score and the name of the students having the highest test score.

Student data should be stored in a **struct** variable of type **studentType**, which has **four** components:

1. studentFName of type string
2. studentLName of type string
3. testScore of type int (testScore is between 0 and 100)
4. grade of type char.

Suppose that the class has 20 students. Use an array of 20 components of type **studentType**. Your program must contain at least the following functions:

1. A function to read the students' data into the array.
2. A function to assign the relevant grade to each student.
3. A function to find the highest test score.
4. A function to print the names of the students having the highest test score.

Your program must output each student's name in this form: last name followed by a comma, followed by a space, followed by the first name.

The **main function** should only be a collection of function calls. Every functionality should be implemented in the user defined functions.

Problem 2:

Define a struct **menuItemType** with two components:

1. menuItem of type string
2. menuPrice of type double.

Write a program to help a local restaurant automate its breakfast billing system. The program should do the following:

1. Show the customer the different breakfast items offered by the restaurant.
2. Allow the customer to select more than one item from the menu.
3. Calculate and print the bill. Assume that the restaurant offers the following breakfast items (the price of each item is shown to the right of the item):

Breakfast Items	Prices
Plain Egg	$1.45
Boiled Egg	$2.45
Muffin	$0.99
French Toast	$1.99
Fruit Basket	$2.49
Cereal	$0.69
Coffee	$0.50
Tea	$0.75

Use an array **menuList** of type **menuItemType**. Your program must contain at least the following functions:

1. Function **getData**: This function loads the data into the array **menuList** from a file.
2. Function **showMenu**: This function shows the different items offered by the restaurant and tells the user how to select the items.
3. Function **printCheck**: This function calculates and prints the check. (Note that the billing amount should include a 5% tax.)

A sample output is:

```
Welcome to Johnny's Restaurant
Bacon and Egg                $2.45
Muffin                       $0.99
Coffee                       $0.50
Tax                          $0.20
Amount Due                   $4.14
```

Problem 3:

Using **structures**, design an online address book to keep track of the

1. Names (string type)
2. Addresses (struct type)
3. phone numbers (string type)
4. Date of Birth (struct type)

Your program should be able to handle unlimited records using a **linked list**.
a. Define a struct **addressType** that can store a **street address**, **city**, **state**, and **ZIP code**.
b. Define a struct **dateType** that can store **day** (int), **month** (string), and **year** (int).

The program should perform the following operations:

1. Load the data into the address book from a file.
2. Add a new entry to the address book.
3. Search for a person by name.
4. Delete an entry from the address book of a given person.
5. Print the address, phone number, and date of birth (if it exists) of a given person.
6. Print the names of the people whose birthdays are in a given month.